NPOESS Status

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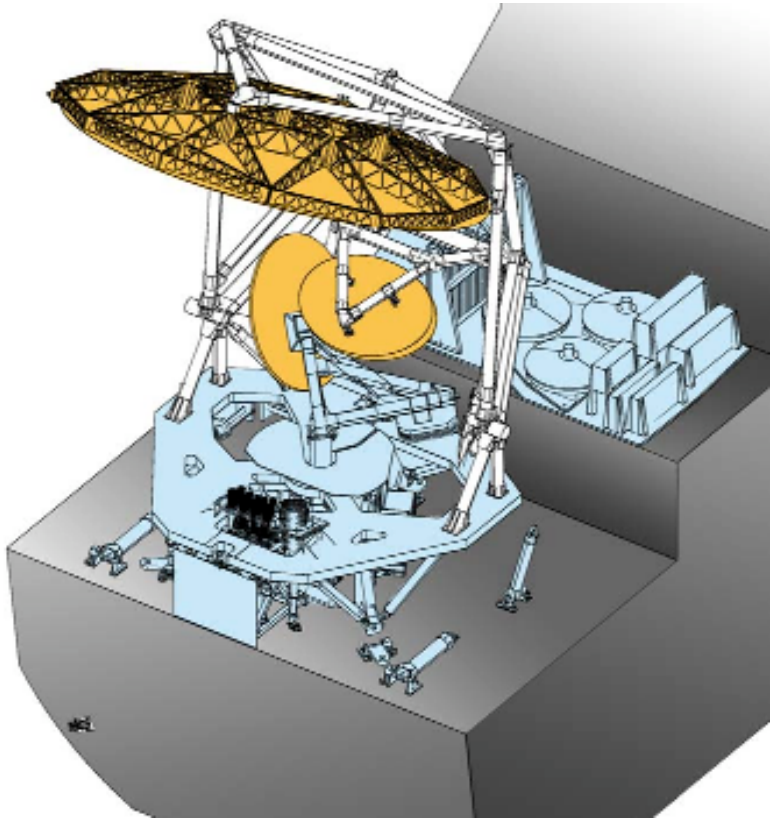
Global Precipitation Mission (GPM) Workshop

November 7, 2006
Annapolis, Maryland.

When last we talked…..

CMIS



Mass, kg	348
Average power, W	374
Average data rate, Mbps	0.5

- The Conical-scanning Microwave Imager Sounder (CMIS) is a passive microwave radiometer with channels for atmospheric sounding as well as for measurements of land, ocean and cloud properties
  - Imaging channels near 6, 10, 18, 36, 89 and 160 GHz
  - Moisture profiling at 23 and 183 GHz
  - Temperature profiling at 50-60 GHz
  - Upper atmosphere temperature profiling with fine lines near 60 GHz
  - Full polarimetry near 10, 18 and 36 GHz
- External warm load and cold sky viewing for calibration every spin
- SSMI and TMI provide heritage
- **Quantities – EMD 2 units, Prod 4 units**

NPOESS Instruments - CMIS

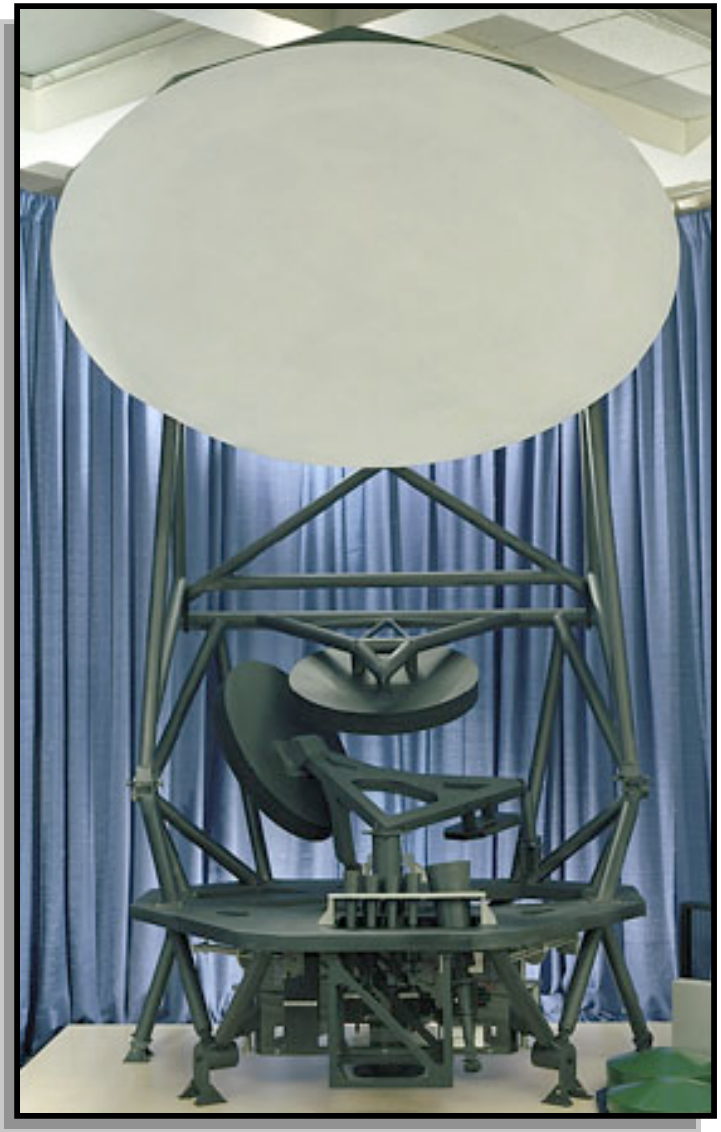
Current Design
- 376 kg. mass, momentum compensated
- 280 kbps data rate
- 340 W power consumption
- Deployable structure
- 6 GHz to 183 GHz measurement range
- 77 Channels
- >0.9 reliability after 7 yrs. on orbit + 8 yrs. storage
  - » Substantial redundancy

Two main reflectors:
- LF: 2.2 m
- HF: 0.7 m
- Spin around common axis @ 31.6 RPM

Two Feedhorn clusters: 1 cluster allocated to each dish
- 16 Feeds
- LF cluster: 12 feedhorns arranged on 3 Earth Incidence Angles
- HF cluster: 4 feedhorns along a single arc with room for growth

Passive 2-point calibration:
- ZAX warm-load
- Cold space reflector

• Cold space reflector



L to R:

TMI

CMIS

SSM/I

What happened

- Program experienced severe cost and schedule problems in the development of its sensor suite - Jan 05
- NPOESS Tri Agency (DoD, NOAA, NASA) EXCOM formed Independent Review Team (IRT) to review NPP- Jan 05
- EXCOM receives results of NPP IRT, and then directs an Independent Program Assessment (IPA) of the entire NPOESS program- Aug 05
- SecAF notified Congress of likely cost breach greater than 15% which triggered Nunn-McCurdy (N-M) breach notification- Sept 05
- USecAF sent “reasonable cause letter” to USD(AT&L) of breach greater than 25% cost- Dec 05
- SECAF notified Congress by letter of N-M certification breach- Jan 06

Nunn-McCurdy – The Law

- Governed by Title 10 USC §2433 for Major Acquisition Programs
- Applies to DoD programs that breach or that the SPD believes will breach certain cost levels
  - Program Acquisition Unit Costs (PAUC), Average Procurement Unit Cost (APUC)
  - > 15%, requires Congressional Notification: NPOESS Notification directed by EXCOM in Sep 05
  - > 25%, requires Secretary of Defense Certification; delegated to Undersecretary of Defense for Acquisition, Technology, and Logistics (AT&L)

The Nunn-McCurdy* Certification Process

- Under Secretary of Defense (USD) (AT&L) must provide to Congress a written certification of the following items:
  1) That this acquisition program is essential
  2) There are no alternatives that provide equal or greater capability at less cost
  3) The new estimates of the program costs are reasonable
  4) The management structure for the program is adequate to manage and control costs

* Note: Title 10 USC §2433

Key Certification Schedule Dates

• Date of Determination (SPD's Letter)	30 Nov 05
• Principals Certification Kick-off Meeting	09 Jan 06
• **SAF notifies Congress**	**12 Jan 06**
• Defense Acquisition Executive (DAE) Review Certification Work Plan	20 Jan 06
• Interim DAE Update*	14 Mar 06
• Interim DAE Update*	6 Apr 06
• SAR to Congress (NLT 60 Days after PB Submission)	**NLT 7 Apr 06**
• Final DAE Review*	4 May 06
• **USD AT&L Certifies to Congress (NLT 60Days after SAR)**	**NLT 5 Jun 06**

Decision Options

- Certify the program with updated cost and schedule
- Certify a restructured program
- Terminate the entire program

NPOESS
Payloads to Satisfy IORD-II

NPOESS Instruments	LTDN LTAN	0530 1730	0930 2130	0130 1330	METOP 0930	NPP 1030
IPO Developed						
Visible/IR Imager Radiometer Suite (VIIRS)*		X	X	X		X
Cross-track IR Sounder (CrIS)*		X		X	X (IASI/HIRS)	X
Conical MW Imager/Sounder (CMIS)*		X	X	X		
Ozone Mapper/Profiler Suite (OMPS)				X	X (GOME)	X
~~GPS Occultation Sensor (GPSOS)~~ Deleted		-		X	X (GRAS)	
Space Environmental Sensor Suite (SESS)		X(-)	X(-)	X(-)	X (SEM)	
Aerosol Polarimeter Sensor (APS)			X			
Leveraged						
Advanced Technology MW Sounder (ATMS)*		X		X	X (AMSU/MHS)	X
Data Collection System (DCS)		X		X	X	
Search and Rescue (SARSAT)		X		X	X	
Earth Radiation Budget Sensor (CERES/ERBS)				X		
Solar Irradiance Sensor (TSIS)		X				
Radar Altimeter (ALT)		X				
Advanced Scatterometer (ASCAT)					X	

* Critical instrument - Failure constitutes need to replace satellite

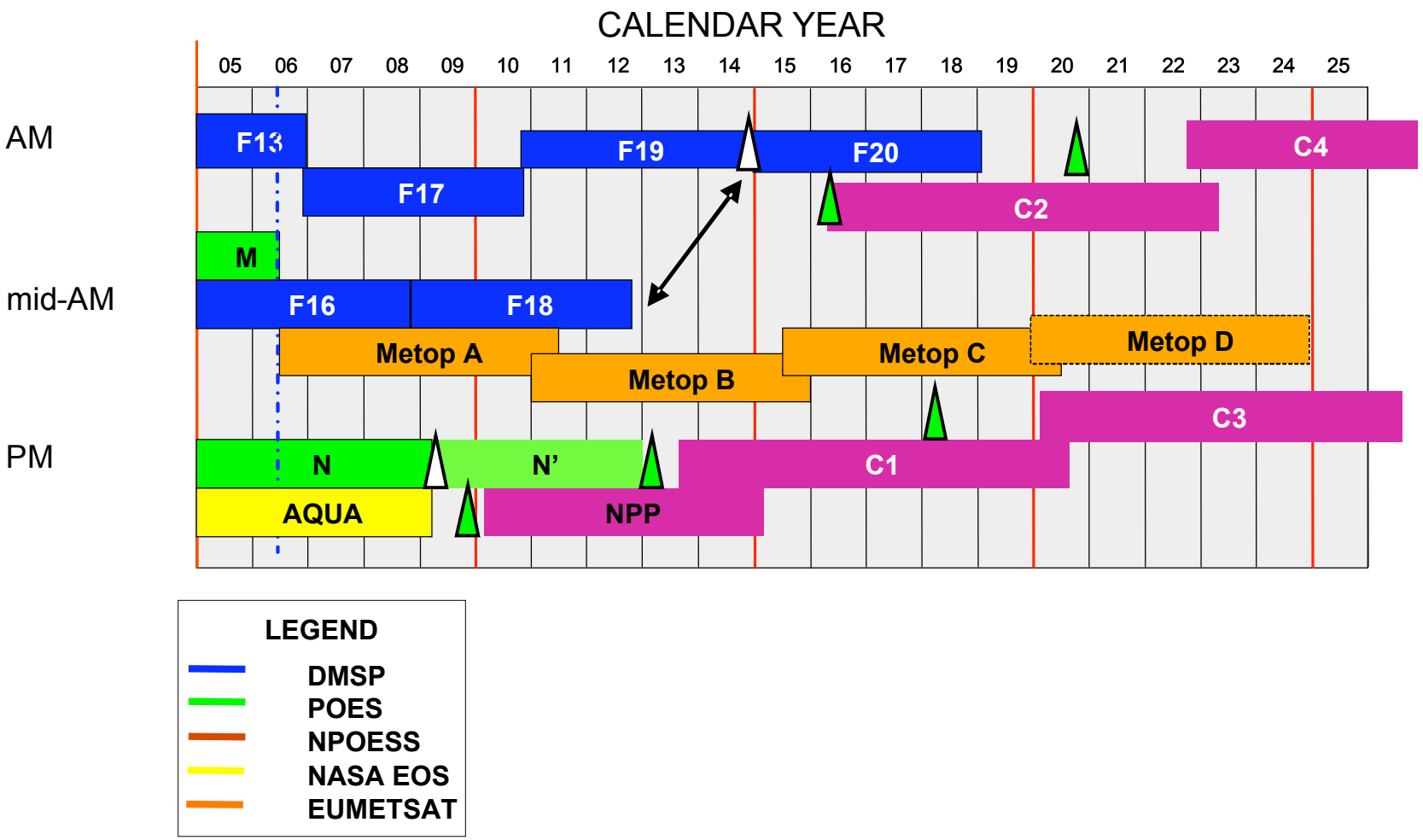
NPOESS
Post Nunn-McCurdy Certification

Items in ▨ are changes as a result of the Nunn-McCurdy recertification

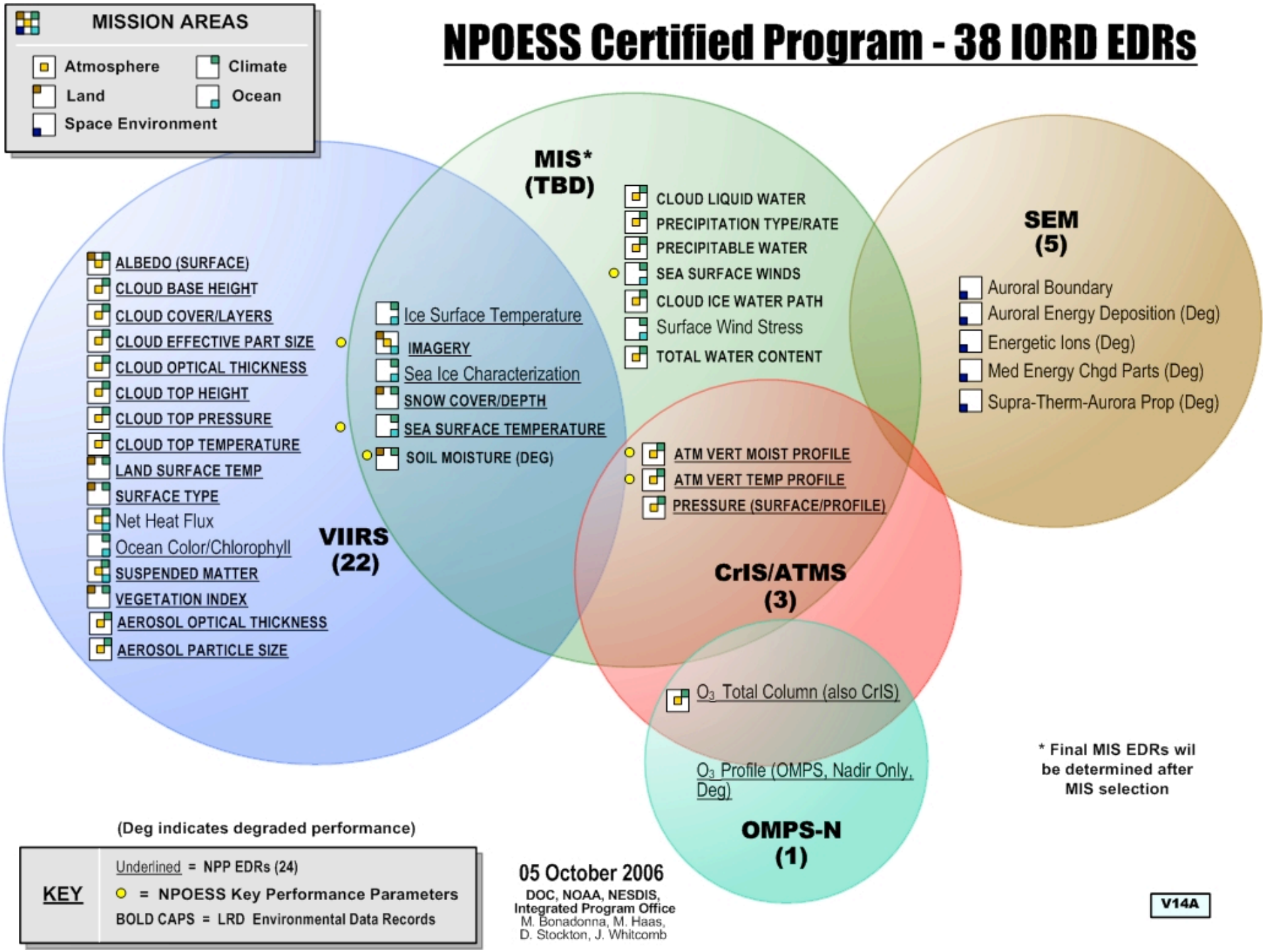
NPOESS Instruments	LTDN LTAN	0530 1730	0130 1330	METOP 0930	NPP 1030
IPO Developed					
Visible/IR Imager Radiometer Suite (VIIRS)*		X	X	AVHRR	X
Cross-track IR Sounder (CrIS)*		▨	X	X (IASI/HIRS)	X
MW Imager/Sounder (MIS)* ▨		X	▨		
Ozone Mapper/Profiler Suite (OMPS)			X-	X (GOME)	X-
~~GPS Occultation Sensor (GPSOS)~~ Deleted		-	X	X (GRAS)	
Space Environmental Sensor Suite (SESS)		▨	X(-)	X (SEM)	
Aerosol Polarimeter Sensor (APS)					
Leveraged					
Advanced Technology MW Sounder (ATMS)*		▨	X	X (AMSU/MHS)	X
Data Collection System (DCS)		X	X	X	
Search and Rescue (SARSAT)		X	X	X	
Earth Radiation Budget Sensor (CERES/ ▨			X		
Solar Irradiance Sensor (TSIS)		▨			
Radar Altimeter (ALT)		▨			
Advanced Scatterometer (ASCAT)				X	

*** Critical instrument - Failure constitutes need to replace satellite **Not on C1**

Certified NPOESS Program



NPOESS Certified Program - 38 IORD EDRs



* Final MIS EDRs wil be determined after MIS selection

(Deg indicates degraded performance)

KEY

Underlined = NPP EDRs (24)

○ = NPOESS Key Performance Parameters

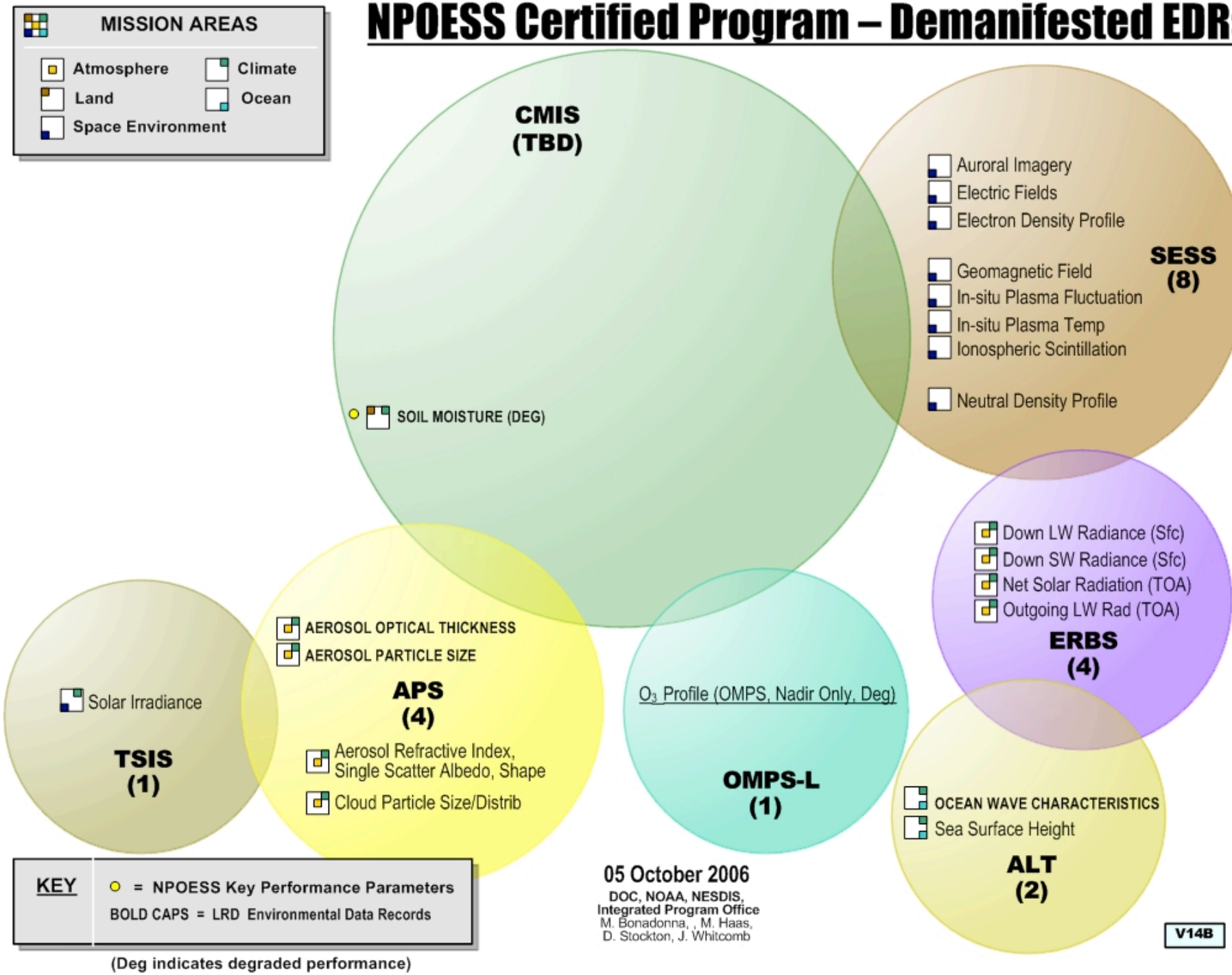
BOLD CAPS = LRD Environmental Data Records

05 October 2006

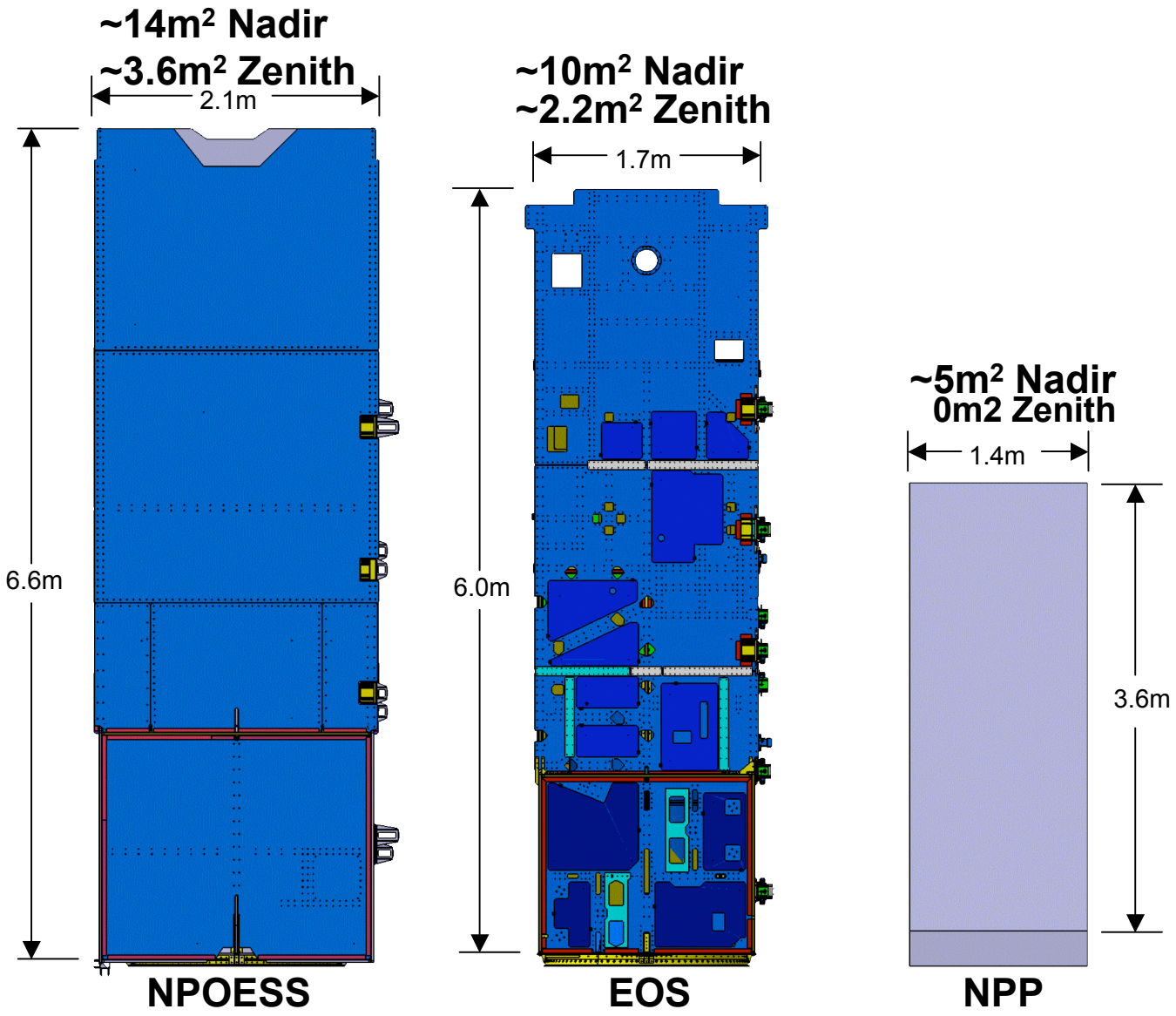
DOC, NOAA, NESDIS,
Integrated Program Office
M. Bonadonna, M. Haas,
D. Stockton, J. Whitcomb

V14A

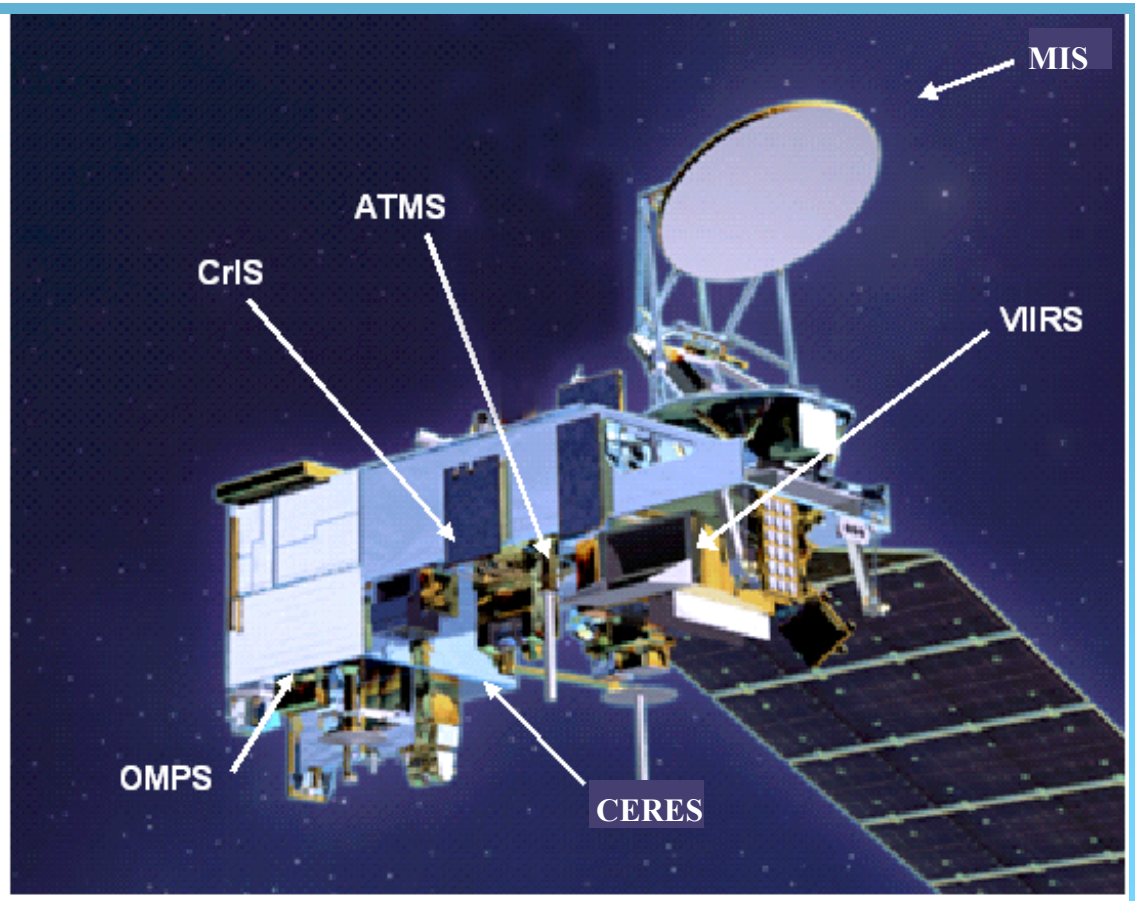
NPOESS Certified Program – Demanifested EDRs



Payload Deck Space is Key



NPOESS Satellite and Sensors
Post Nunn McCurdy

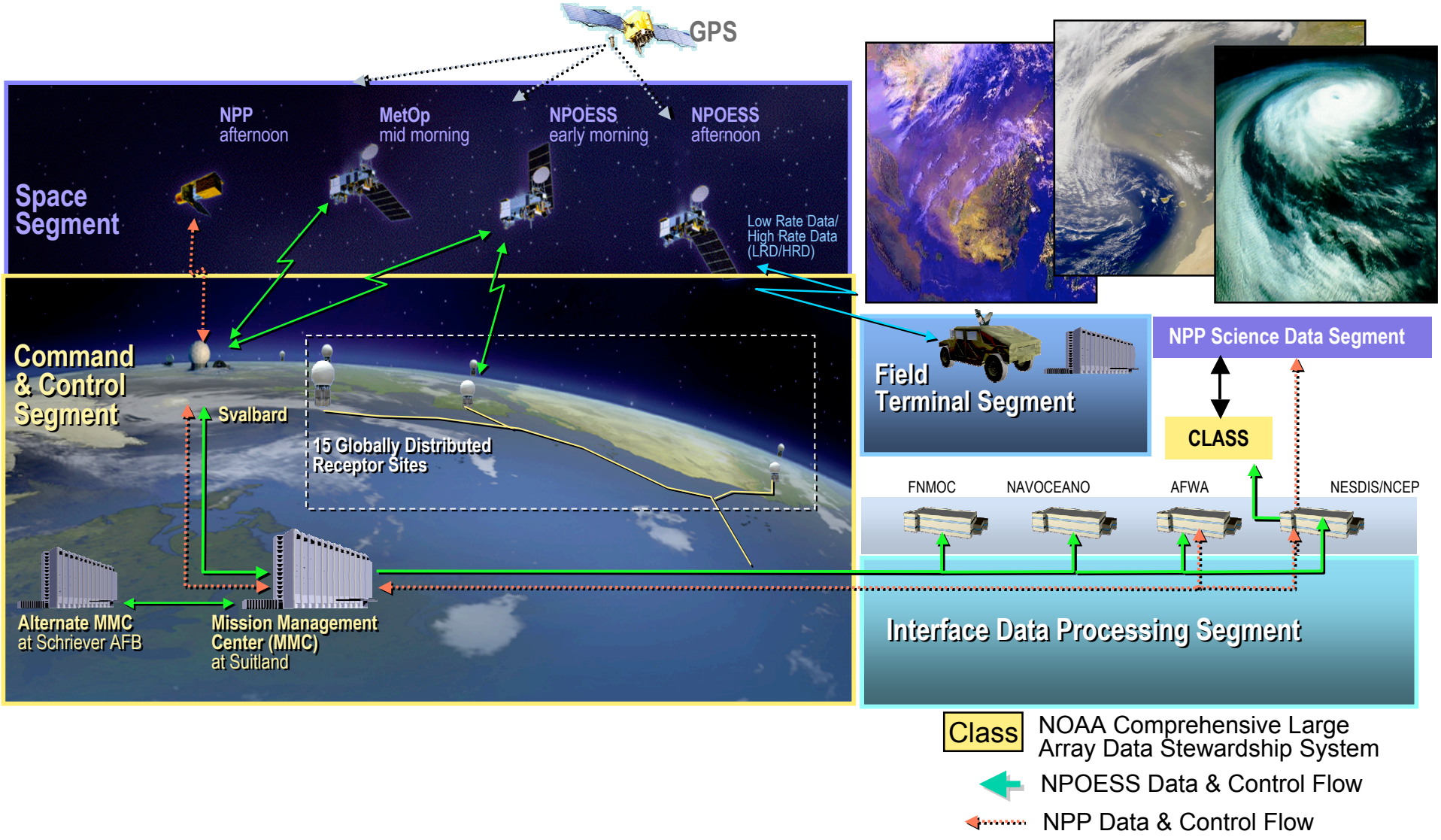


NPOESS 1330 Configuration

	1330	1730	NPP
VIIRS	X	X	X
MIS	X *	X	
CrIS	X		X
ATMS	X		X
SESS	X		
OMPS	X		X
ADCS	X	X	
SARSAT	X	X	
CERES	X		

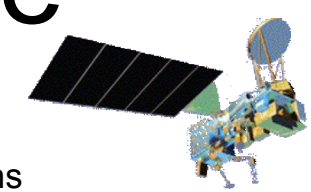
* Not on C1

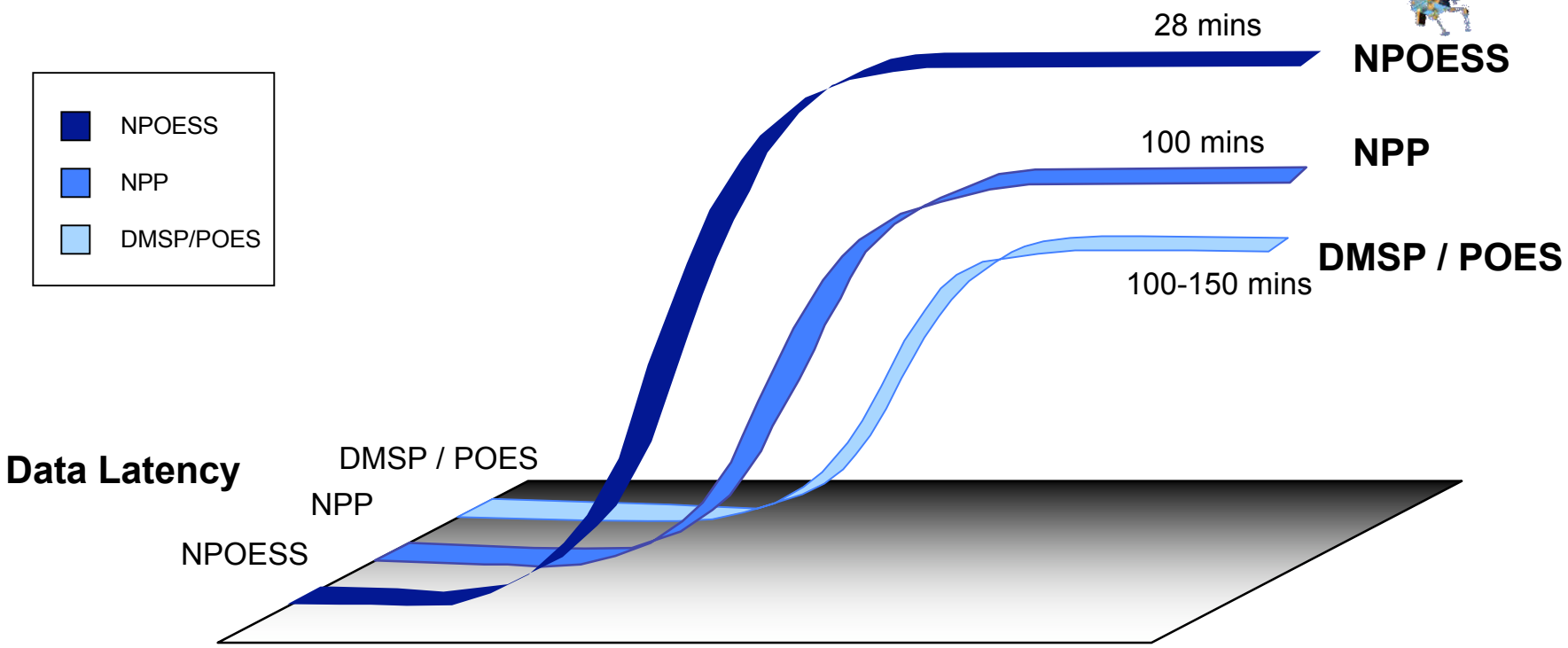
Post NM NPOESS Top Level Architecture



Global Connection— High Speed Network for Rapid Data Dissemination

NPOESS Performance





Improvements over Heritage	Data Rate	Data Volume	Encryption	Spectral Capability	Vertical Resolution
NPOESS	**20Mbps**	**5.4 TB/day**	**Selective**	**22 bands**	**1300 bands**
Heritage	**1.5Mbps**	**6.3 GB/day**	**Total**	**5 bands**	**40 bands**

NPOESS Satisfies Evolutionary Program Needs with Enhanced Capabilities

MIS

- On all NPOESS platforms beginning with C2 (2016)
- Working with users to define a less complex sensor than CMIS
- Request for Information (RFI) released October 2006, closes December 31.
  - http://www.fbo.gov/spg/USAF/AFSC/SMCSMSC/80/listing.html
- Acquisition Strategy recommendation by January 2007

Performance Related Trades Involve:

- Imaging channels
  - Surface wetness
  - Sea Surface Temperarure
- Wind determination capability
  - Polarimetric channels: Sea Surface Wind Direction
- Sounding channels
  - 50 to 60-GHz channel suite with 166/183-GHz channels: Atmospheric Temperature and Moisture Profiles
- Sensor and Reflector Size

Summary

Restructuring is a means to address and mitigate previous procurement risks

An acquisition strategy decision for the NPOESS Microwave Imager is expected by January 2007

Conical Microwave Sensoris still a key part of NPOESS!

Stay Tuned!